

CLAIMS

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2 **1.** A mobile device, comprising:
3 a keypad of number keys, the number keys having associated letters;
4 a language system to receive an input string entered via the keypad that is
5 representative of one or more phonetic characters and generate likely language
6 characters based on the input string;
7 a display to present the likely language characters for user selection; and
8 the language system being configured to facilitate input of the input string
9 and selection of a language character without switching modes between input and
10 selection.

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12 **2.** A mobile device as recited in claim 1, wherein the phonetic characters
13 are Chinese Pinyin and the language characters are Chinese Hanzi.

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15 **3.** A mobile device as recited in claim 1, wherein the likely language
16 characters are presented on the display in an index that associates selection keys of
17 the keypad with the language characters so that user entry of a selection key
18 results in a selection of a corresponding language character and user entry of a
19 non-selection key results in further input.
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1 4. A mobile device as recited in claim 1, wherein the likely language
2 characters are presented on the display in an index that associates selection keys of
3 the keypad with the language characters, the selection keys being selected based
4 on whether the letters associated therewith follow the phonetic characters already
5 entered.

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7 5. A mobile device as recited in claim 1, wherein the language system
8 includes an association module that automatically presents the language characters
9 as the user depresses individual keys.

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11 6. A mobile device as recited in claim 1, wherein the language system
12 includes a sentence-based search engine to derive the language characters based
13 on context of the input string within one or more words of a common sentence.

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15 7. A mobile device as recited in claim 1, wherein the language system
16 includes a language model to statistically derive the language characters.

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18 8. A mobile device as recited in claim 1, wherein the language system
19 includes a character-based bigram language model and a word-based N-gram
20 language model, where $N > 2$.

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22 9. A mobile device as recited in claim 1, wherein the language system
23 converts the phonetic characters to the language characters.

1 **10.** A mobile device as recited in claim 1, wherein the language system
2 includes a direct key-based search engine that generates the language characters
3 based on a key sequence entered on the keypad in lieu of converting the phonetic
4 characters to the language characters.

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6 **11.** A mobile device as recited in claim 1, wherein the language system
7 includes.

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9 **12.** A mobile device as recited in claim 1, wherein the language system
10 includes a first name model to detect first names in the input string.

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12 **13.** A mobile device as recited in claim 1, wherein the language system
13 comprises:

14 a first name model to detect first names in the input string;

15 a surname model to detect surnames in the input string; and

16 a character-based bigram language model.

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18 **14.** A mobile device as recited in claim 1, wherein the language system
19 comprises:

20 a resident language model residing on the mobile device to statistically
21 derive the language characters using a first statistical language model; and

22 a nonresident language model residing on a remote server,
23 communicatively coupled to the mobile device, to statistically derive the language
24 characters using a second statistical language model.
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2 **15.** A mobile device as recited in claim 1, further comprising a scroll
3 control key to present other likely language characters.

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5 **16.** A mobile device as recited in claim 1, embodied as a mobile phone.

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7 **17.** A mobile device, comprising:
8 a keypad of number keys, the number keys having associated letters of an
9 alphabet; and
10 a direct key-based search engine that generates possible language
11 characters that are not part of the alphabet based on a key sequence entered on the
12 keypad.

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14 **18.** A mobile device as recited in claim 17, wherein the alphabet is an
15 English alphabet and the language characters are Chinese Hanzi.

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17 **19.** A mobile device as recited in claim 17, further comprising an
18 association module that automatically presents the language characters as the user
19 depresses individual keys.

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21 **20.** A mobile device as recited in claim 17, embodied as a mobile
22 phone.

1 **21.** A mobile device, comprising:
2 a keypad of number keys, the number keys having associated letters of an
3 alphabet;
4 an association module that associates a key sequence with language
5 characters that are not part of the alphabet; and
6 a display to present the possible language characters as the user depresses
7 individual keys based on the key sequence.

8
9 **22.** A mobile device as recited in claim 21, wherein the alphabet is an
10 English alphabet and the language characters are Chinese Hanzi.

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12 **23.** A mobile device as recited in claim 21, embodied as a mobile
13 phone.

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15 **24.** A mobile device, comprising:
16 a keypad of number keys, the number keys having associated letters of an
17 alphabet;
18 a language system to receive an input string entered via the keypad that is
19 representative of one or more phonetic characters and convert the phonetic
20 characters to language characters that are not part of the alphabet using a statistical
21 language model that utilizes at least one neighboring word in a common sentence;
22 and
23 a display to present the language characters for user selection.

1 **25.** A mobile device as recited in claim 24, wherein the alphabet is an
2 English alphabet and the language characters are Chinese Hanzi.

3
4 **26.** A mobile device as recited in claim 24, embodied as a mobile
5 phone.

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7 **27.** A system comprising:
8 a resident language model residing on a mobile device to convert phonetic
9 characters input into the mobile device into language characters using a first
10 statistical language model; and
11 a nonresident language model residing on a server remote from the mobile
12 device, the nonresident language model being configured to convert the phonetic
13 characters into the language characters using a second statistical language model.

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15 **28.** A system as recited in claim 27, wherein the first statistical language
16 model is a character-based bigram language model and the second statistical
17 language model is a word-based N-gram language model, where $N > 2$.

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19 **29.** A method comprising:
20 receiving an input string entered via a keypad;
21 presenting likely language characters based on the input string; and
22 facilitating continued entry of the input string and selection of a suitable
23 language character without switching modes between input and selection.

1 **30.** A method as recited in claim 29, wherein the language characters are
2 Chinese Hanzi.

3
4 **31.** A method as recited in claim 29, further comprising indexing the
5 likely characters when presented in a manner that associates certain keys of the
6 keypad with the language characters so that user entry of a certain key results in a
7 selection and user entry of a non-certain key results in further input.

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9 **32.** A method as recited in claim 29, further comprising:
10 associating key entries with the language characters; and
11 presenting the likely language characters intended by the user as the user
12 depresses individual keys.

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14 **33.** A method as recited in claim 29, further comprising deriving the
15 language characters using a context-based statistical language model.

16
17 **34.** A method as recited in claim 29, further comprising detecting
18 surnames in the input string.

19
20 **35.** A method as recited in claim 29, further comprising detecting first
21 names in the input string.

1 **36.** A computer-readable medium storing computer-executable
2 instructions that, when executed on a processor, perform the method as recited in
3 claim 29.

4
5 **37.** One or more computer-readable media having stored thereon a
6 plurality of instructions that, when executed by one or more processors of a
7 computer, causes the one or more processors to perform acts including:

8 receiving an input string entered via a numeric-based keypad where number
9 keys in the keypad have associated letters in an alphabet, the input string being
10 representative of one or more phonetic characters;

11 converting the input string of phonetic characters to possible language
12 characters that are not part of the alphabet; and

13 presenting the language characters using an index that associates selection
14 keys of the keypad with the language characters, the selection keys being chosen
15 based on whether the letters associated with the selection keys are likely to follow
16 the phonetic characters already entered.

17
18 **38.** One or more computer-readable media as recited in claim 37,
19 wherein the phonetic characters are Chinese Pinyin and the language characters
20 are Chinese Hanzi.

1 **39.** One or more computer-readable media as recited in claim 37,
2 wherein the plurality of instructions further cause the one or more processors to
3 perform acts including selecting one of the selection keys to selection one of the
4 language characters.

5
6 **40.** One or more computer-readable media as recited in claim 37,
7 wherein the plurality of instructions further cause the one or more processors to
8 perform acts including selecting a key that is not a selection key to continue the
9 input string.

10
11 **41.** One or more computer-readable media as recited in claim 37,
12 wherein the plurality of instructions further cause the one or more processors to
13 perform acts including:

14 associating key entries with the language characters; and
15 presenting the likely language characters intended by the user as the user
16 depresses individual keys.

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18 **42.** One or more computer-readable media as recited in claim 37,
19 wherein the plurality of instructions further cause the one or more processors to
20 perform acts including deriving the language characters using a context-based
21 statistical language model.

1 **43.** One or more computer-readable media as recited in claim 37,
2 wherein the plurality of instructions further cause the one or more processors to
3 perform acts including detecting surnames in the input string.

4
5 **44.** One or more computer-readable media as recited in claim 37,
6 wherein the plurality of instructions further cause the one or more processors to
7 perform acts including detecting first names in the input string.

8
9 **45.** A method comprising:
10 facilitating entry of phonetic characters via discrete keys of a keypad; and
11 generating possible language characters intended by the user based on a key
12 sequence entered on the keypad in lieu of converting the phonetic characters to the
13 language characters.

14
15 **46.** A computer-readable medium storing computer-executable
16 instructions that, when executed on a processor, perform the method as recited in
17 claim 45.

18
19 **47.** A method comprising:
20 receiving key entries entered via a numeric-based keypad where number
21 keys in the keypad have associated letters;
22 associating strings of key entries with language characters that are different
23 than the letters; and
24 presenting likely language characters intended by the user as the user
25 depresses individual keys.

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2 **48.** A computer-readable medium storing computer-executable
3 instructions that, when executed on a processor, perform the method as recited in
4 claim 47.

5
6 **49.** A method comprising:
7 receiving an input string entered via a numeric-based keypad where number
8 keys in the keypad have associated letters, the input string being representative of
9 one or more phonetic characters;
10 converting the input string of phonetic characters to possible language
11 characters based upon a context of at least one word in a sentence within which
12 the input string is a part; and
13 presenting the possible language characters for selection by the user.

14
15 **50.** A computer-readable medium storing computer-executable
16 instructions that, when executed on a processor, perform the method as recited in
17 claim 49.

18
19 **51.** A method comprising:
20 receiving an input string entered via a keypad on a mobile device;
21 sending the input string to a remote server;
22 generating likely language characters based on the input string at the
23 remote server; and
24 returning the likely language characters to the mobile device for display.
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